

- 24-hour Telephone Number: (937) 847-3200
Use for urgent or emergency needs for technical support, service and/or replacement parts
- Routine Technical Inquiries: techsupport@motoman.com
Allow up to 36 hours for response

MOTOMAN ENCODER REPLACEMENT MANUAL

FOR AC SERVOMOTOR (SGM7G SERIES)

Upon receipt of the product and prior to initial operation, read these instructions thoroughly, and retain for future reference.

MOTOMAN INSTRUCTIONS

MOTOMAN-□□□ INSTRUCTIONS

YRC1000 INSTRUCTIONS

YRC1000 OPERATOR'S MANUAL (GENERAL) (SUBJECT SPECIFIC)

YRC1000 MAINTENANCE MANUAL

YRC1000 ALARM CODES (MAJOR ALARMS) (MINOR ALARMS)

Please have the following information available when contacting Yaskawa Customer Support:

- System
- Primary Application
- Software Version (*Located on Programming Pendant by selecting: {Main Menu} - {System Info} - {Version}*)
Robot Serial Number (*Located on robot data plate*)
Robot Sales Order Number (*Located on controller data plate*)

Part Number: 185870-1CD
Revision: 0



DANGER

- This instruction manual is intended to explain mainly on the mechanical part of this manipulator for the application to the actual operation and for proper maintenance and inspection. It describes on safety and handling, details on specifications, necessary items on maintenance and inspection, to explain operating instructions and maintenance procedures. Be sure to read and understand this instruction manual thoroughly before installing and operating the manipulator. Any matter not described in this manual must be regarded as “prohibited” or “improper”.
- General information related to safety are described in “Chapter 1. Safety” of the YRC1000 INSTRUCTIONS. To ensure correct and safe operation, carefully read “Chapter 1. Safety” of the YRC1000 INSTRUCTIONS.



CAUTION

- In some drawings in this manual, protective covers or shields are removed to show details. Make sure that all the covers or shields are installed in place before operating this product. The drawings and photos in this manual are representative examples and differences may exist between them and the delivered product.
- YASKAWA is not responsible for incidents arising from unauthorized modification of its products. Unauthorized modification voids the product warranty.

NOTICE

- The drawings and photos in this manual are representative examples and differences may exist between them and the delivered product.
- YASKAWA may modify this model without notice when necessary due to product improvements, modifications, or changes in specifications. If such modification is made, the manual number will also be revised.
- If your copy of the manual is damaged or lost, contact a YASKAWA representative to order a new copy. The representatives are listed on the back cover. Be sure to tell the representative the manual number listed on the front cover.

Notes for Safe Operation

Read this manual carefully before installation, operation, maintenance, or inspection of your manipulator.

In this manual, the Notes for Safe Operation are classified as “DANGER”, “WARNING”, “CAUTION”, “MANDATORY”, or “PROHIBITED”.



DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. Safety Signs identified by the signal word DANGER should be used sparingly and only for those situations presenting the most serious hazards.



WARNING

Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury. Hazards identified by the signal word WARNING present a lesser degree of risk of injury or death than those identified by the signal word DANGER.



CAUTION

Indicates a hazardous situation, which if not avoided, could result in minor or moderate injury. It may also be used without the safety alert symbol as an alternative to “NOTICE”.

NOTICE

NOTICE is the preferred signal word to address practices not related to personal injury. The safety alert symbol should not be used with this signal word. As an alternative to “NOTICE”, the word “CAUTION” without the safety alert symbol may be used to indicate a message not related to personal injury.

Even items described as “CAUTION” may result in a serious accident in some situations.

At any rate, be sure to follow these important items.



To ensure safe and efficient operation at all times, be sure to follow all instructions, even if not designated as “DANGER”, “WARNING” and “CAUTION”.

**DANGER**

- Do not remove the motor, and do not release the brake.

Failure to observe these safety precautions may result in death or serious injury from unexpected turning of the manipulator's arm.

**WARNING**

- Maintenance and inspection must be performed by specified personnel.
- For disassembly or repair, contact your YASKAWA representative.



DANGER

- Before operating the manipulator, make sure the servo power is turned OFF by performing the following operations. When the servo power is turned OFF, the SERVO ON LED on the programming pendant is turned OFF.
 - Press the emergency stop buttons on the front door of the YRC1000, on the programming pendant, on the external control device, etc.
 - Disconnect the safety plug of the safety fence. (when in the play mode or in the remote mode)

If operation of the manipulator cannot be stopped in an emergency, personal injury and/or equipment damage may result.

Fig. : Emergency Stop Button



- Before releasing the emergency stop, make sure to remove the obstacle or error caused the emergency stop, if any, and then turn the servo power ON.

Failure to observe this instruction may cause unintended movement of the manipulator, which may result in personal injury.

Fig. : Release of Emergency Stop



- Observe the following precautions when performing a teaching operation within the manipulator's operating range:
 - Be sure to perform lockout by putting a lockout device on the safety fence when going into the area enclosed by the safety fence. In addition, the operator of the teaching operation must display the sign that the operation is being performed so that no other person closes the safety fence.
 - View the manipulator from the front whenever possible.
 - Always follow the predetermined operating procedure.
 - Always keep in mind emergency response measures against the manipulator's unexpected movement toward a person.
 - Ensure a safe place to retreat in case of emergency.

Failure to observe this instruction may cause improper or unintended movement of the manipulator, which may result in personal injury.

- Confirm that no person is present in the manipulator's operating range and that the operator is in a safe location before:
 - Turning ON the YRC1000 power
 - Moving the manipulator by using the programming pendant
 - Running the system in the check mode
 - Performing automatic operations

Personal injury may result if a person enters the manipulator's operating range during operation. Immediately press an emergency stop button whenever there is a problem. The emergency stop buttons are located on the front panel of the YRC1000 and on the right of the programming pendant.

- Read and understand the Explanation of the Warning Labels before operating the manipulator.



WARNING

- Perform the following inspection procedures prior to conducting manipulator teaching. If there is any problem, immediately take necessary steps to solve it, such as maintenance and repair.
 - Check for a problem in manipulator movement.
 - Check for damage to insulation and sheathing of external wires.
- Always return the programming pendant to the hook on the YRC1000 cabinet after use.

If the programming pendant is left unattended on the manipulator, on a fixture, or on the floor, etc., the Enable Switch may be activated due to surface irregularities of where it is left, and the servo power may be turned ON. In addition, in case the operation of the manipulator starts, the manipulator or the tool may hit the programming pendant left unattended, which may result in personal injury and/or equipment damage.

Definition of Terms Used Often in This Manual

The MOTOMAN is the YASKAWA industrial robot product.

The MOTOMAN usually consists of the manipulator, the controller, the programming pendant, and supply cables.

In this manual, the equipment is designated as follows:

Equipment	Manual Designation
YRC1000 controller	YRC1000
YRC1000 programming pendant	Programming pendant
Cable between the manipulator and the controller	Manipulator cable

Registered Trademark

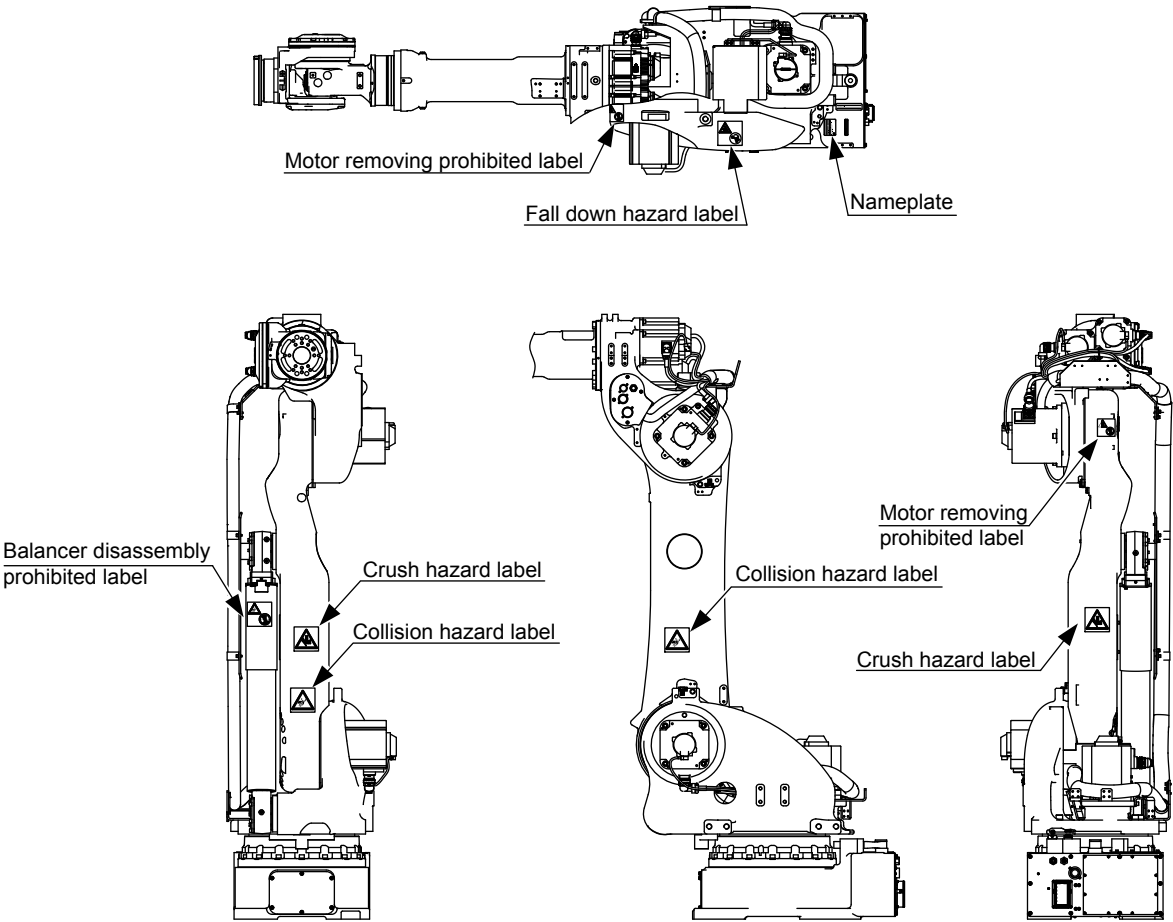
In this manual, names of companies, corporations, or products are trademarks, registered trademarks, or brand names for each company or corporation. The indications of (R) and TM are omitted.

Explanation of Warning Labels


The following warning labels are attached to the manipulator. Always follow the warnings on the labels.
Also, an identification label with important information is placed on the body of the manipulator. Prior to operating the manipulator, confirm the contents.

Note: Taking the maintenance-relevant trainings offered by YASKAWA is indispensable for replacing the L-axis of the balancer-equipped manipulator.

Fig. : Warning Label Locations



Nameplate

TYPE	
DATE	PAYLOAD
SERIAL NO.	MASS
	kg
	kg
YASKAWA ELECTRIC CORPORATION 2-1 Kurosakishiroishi, Yahatanishi-ku, Kitakyushu 806-0004 Japan MADE IN JAPAN	
	
NJ4030	

Fall down hazard label**Description**

Make sure to secure the manipulator base by using the bolts of the specified sizes and by tightening the bolts with the specified tightening torques. If the power is turned ON and the manipulator is operated without securing the manipulator properly, the manipulator may fall down, which may result in personal injury and/or equipment damage.

Collision hazard label**Description**

Personal injury may result if a person enters the manipulator's operating range during operation. Immediately press an emergency stop button whenever there is a problem. Confirm that no person is present in the manipulator's operating range and that the operator is in a safe location before:

- Turning ON the YRC1000 power
- Moving the manipulator by using the programming pendant
- Running the system in the check mode
- Performing automatic operations

Crush hazard label**Description**

Keep clear of moving parts when performing a teaching operation within the manipulator's operating range. Failure to observe this instruction may result in personal injury.

Balancer disassembly prohibited label**Description**

Do not disassemble the balancer.

When disassembling the balancer, the internal energy is released and the L-arm rotates. Failure to observe this caution may result in injury or malfunction.

Motor removing prohibited label**Description**

Do not remove the motor without mounting the jig for fixing the motor. Failure to observe this safety precaution may result in injury from unexpected turning of the manipulator's arm.

Contents

1	Encoder Replacement.....	1-1
1.1	Important Reminders Before Replacement.....	1-1
1.2	Subject Motors.....	1-3
1.3	Required Parts and Tools	1-3
1.3.1	Required Parts.....	1-3
1.3.2	Required Tool	1-3
2	Encoder Replacement Procedures	2-1
2.1	Remove.....	2-1
2.2	Installation.....	2-4
3	Encoder Dimension.....	3-1

1	Encoder Replacement
1.1	Important Reminders Before Replacement

1 Encoder Replacement

1.1 Important Reminders Before Replacement



This is an encoder replacement manual for AC servo motors (SGM7G series) for manipulators.

Read this manual carefully before replacing the encoder.

Failure to observe these cautions may result in malfunction or damage to the equipment.



DANGER

- Before replacing the motors and encoders, make sure that:
 - The power is turned OFF.
 - The dirt or dust on the area around the covers is removed.
 - The wires of the encoders are disconnected.
- After the encoder replacement, check if there is no alarm indication or abnormal noise by operating the manipulator in a teach mode.

Failure to observe these warnings may result in injury, malfunction, or damage to the equipment.

1 Encoder Replacement

1.1 Important Reminders Before Replacement



CAUTION

- Motors and encoders are precision instruments. Be sure to handle them with care.
- Do not loosen the bolts and screws which are not specified in this manual.
- Perform the replacement under the clean, dry environment where there is no oil mist or extremes of humidity.
- Encoders could be damaged by static electricity. Perform the replacement wearing tools which can discharge the static electricity, such as wrist straps.
- Avoid dust getting into the tapered parts of couplings, hollow shaft tapered parts of encoders. (Foreign substances in those parts may cause a damage to the equipment.)
- Be sure not to scratch the tapered parts of couplings.
- Avoid excessive shock on the motors and encoders during the replacement.
- Pay special attentions not to damage the couplings. In case of damaging a coupling, contact a Yaskawa representative.



The environmental requirements for spare encoders are as follows.

- Temperature: 0 to 40C°.
- Humidity: 20 to 80% Rh (at a constant temperature).

Failure to observe these cautions may result in malfunction or damage to the equipment.

1	Encoder Replacement
1.2	Subject Motors

1.2 Subject Motors

- SGM7G-05APK-YR1□
 - SGM7G-05APK-YR2□
 - SGM7G-09APK-YR1□
 - SGM7G-13APK-YR1□
 - SGM7G-20APK-YR1□
 - SGM7G-30APK-YR1□
 - SGM7G-37APK-YR1□
 - SGM7G-44APK-YR1□
 - SGM7G-44APK-YR2□
 - SGM7G-50APK-YR1□
 - SGM7G-75APK-YR1□
 - SGM7G-1AAPK-YR1□
- Encoder type: UTTAH-B20RT

1.3 Required Parts and Tools

Prepare the following parts and tools for the encoder replacement.

1.3.1 Required Parts

- Replacement encoder
Type: 100-243-979
Dimension drawing number: 900-215-889
<Attachments>

O-ring	:S75	1
Hexagon socket head cap screw with conical spring washer ¹⁾ (for encoder mounting)	:400-007-877-1 M3x20	4

1 For the encoder fixing screw, apply some adhesive agent to the screw tip.

1.3.2 Required Tool

Hexagonal wrench 2.5	:For screw M3
Torque wrench 2.5	:For screw M3 :Tightening torque 1.48 N•m

2	Encoder Replacement Procedures
2.1	Remove

2 Encoder Replacement Procedures

2.1 Remove

1. Unscrew the encoder mounting screw.
Tool used: Hexagonal wrench for screw M3



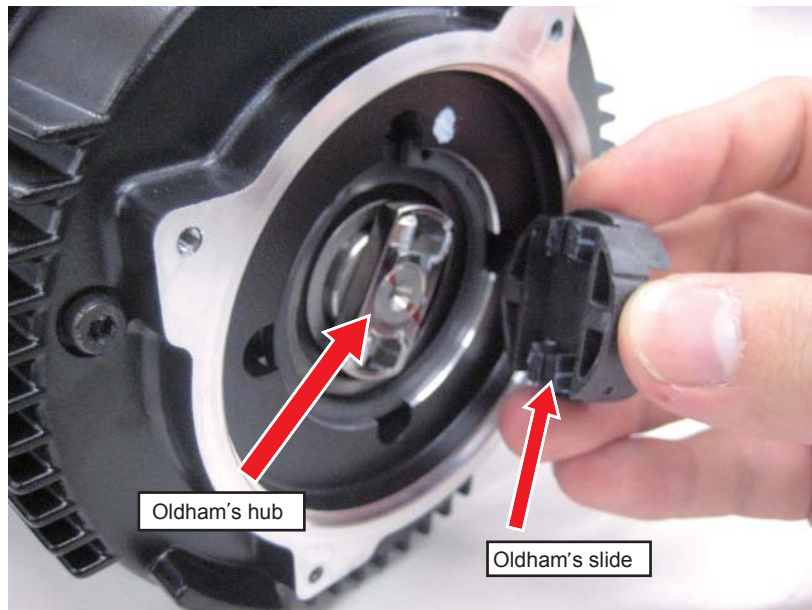
2. Remove the encoder unit.



2 Encoder Replacement Procedures

2.1 Remove

3. Remove the Oldham's slide.



– Encoder unit, O-ring: subject parts for replacement



2 Encoder Replacement Procedures

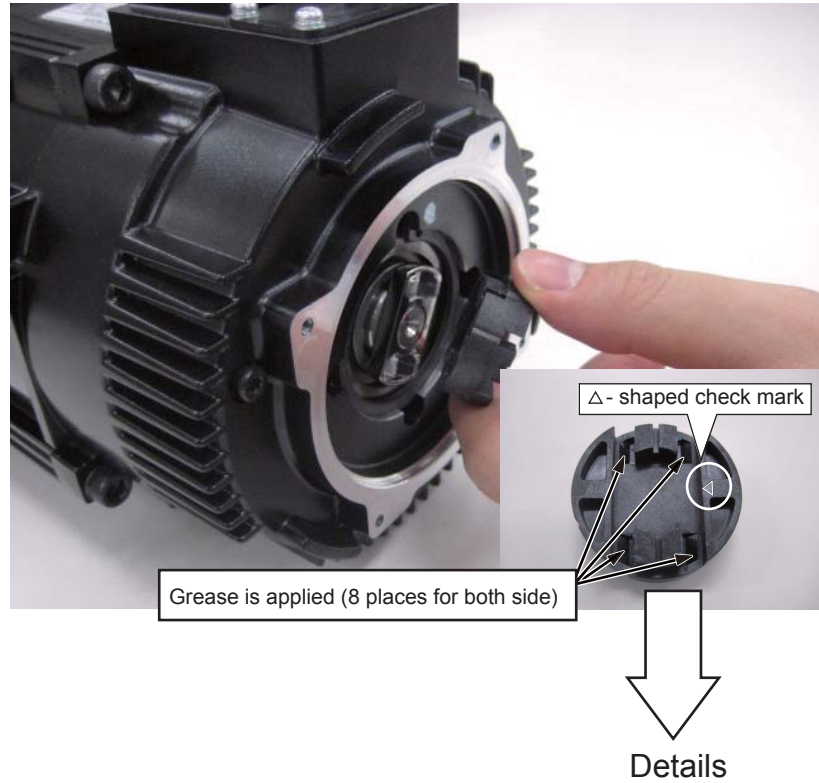
2.1 Remove

- Oldham's slide: subject parts for replacement

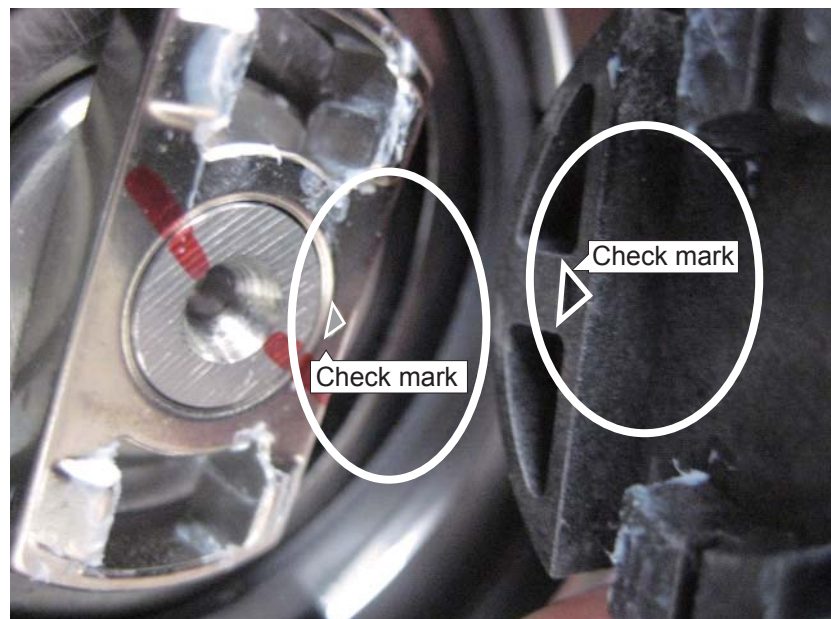


2.2 Installation

1. Install the Oldham's slide.
Confirm that grease is applied to the Oldham's slide (for replacing).
(Grease is applied to it the Oldham's hub before shipping.)



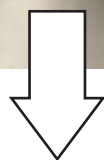
- Align the triangle-shaped check mark on both the Oldham's hub and the Oldham's slide.
Do not wipe off grease.



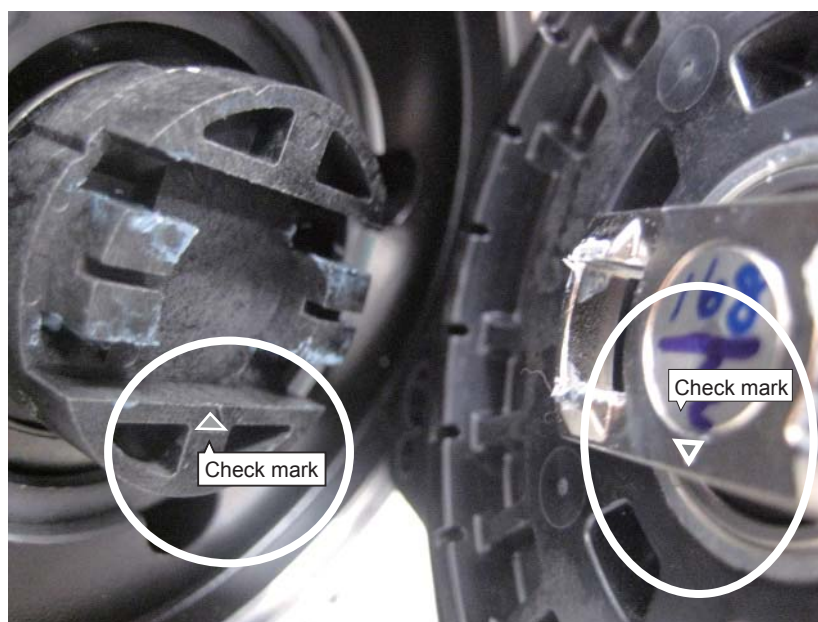
2 Encoder Replacement Procedures

2.2 Installation

2. Details of encoder unit (with O-ring) installation procedures



Details



Align the triangle-shaped check mark on both the Oldham's hub and the Oldham's slide.
(Grease is applied to the Oldham's hub before shipping.)
Do not wipe off grease.

2 Encoder Replacement Procedures

2.2 Installation

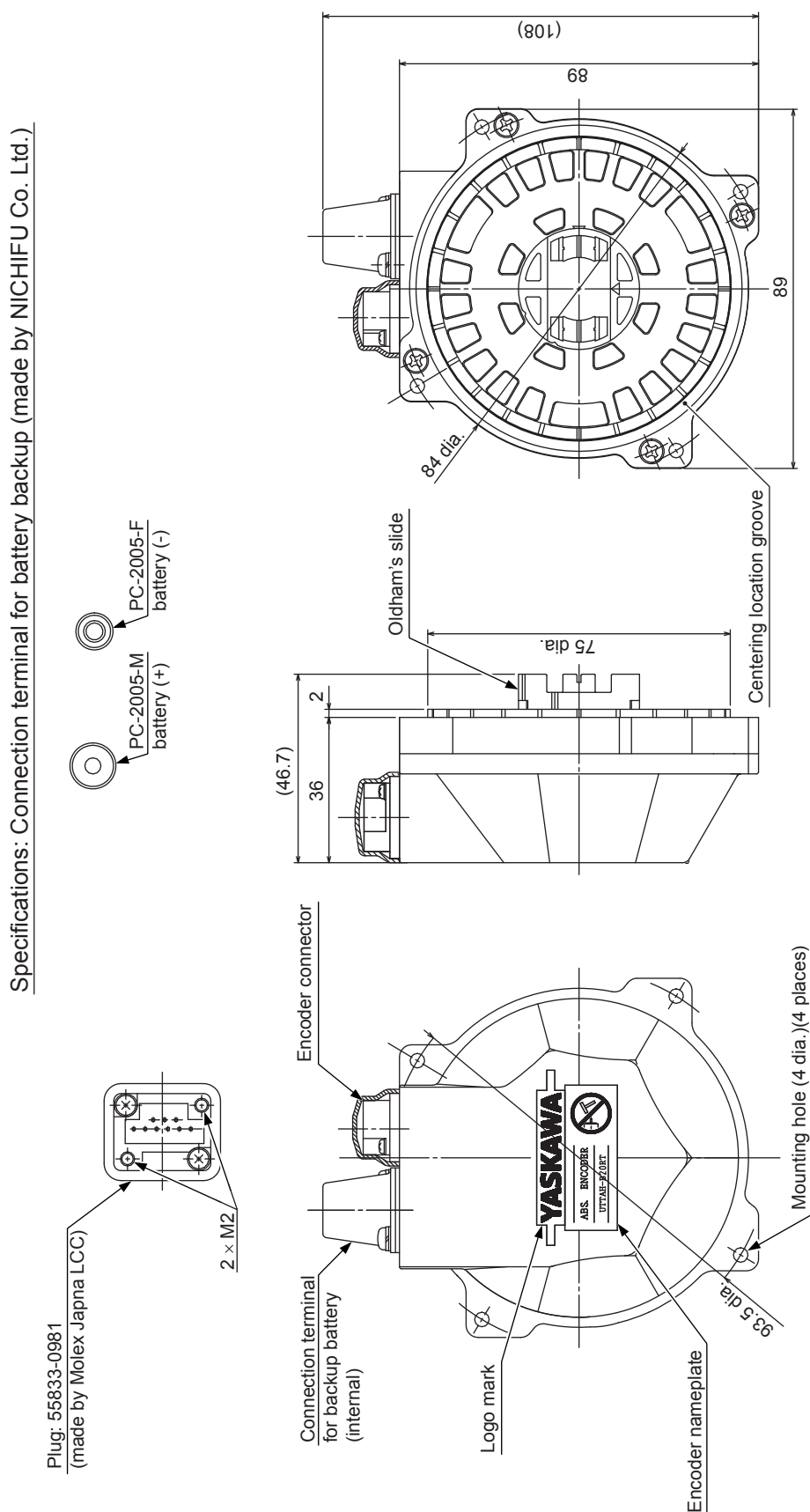
3. Screw encoder installing screws.



Adhesive is preliminary applied to the screws.
(Tightening torque 1.48 N•m)
Tool used: Torque wrench M3

3 Encoder Dimension

Fig. 3-1: Dimension of Encoder



MOTOMAN

ENCODER REPLACEMENT MANUAL

FOR AC SERVOMOTOR (SGM7G SERIES)

HEAD OFFICE

2-1 Kurosakishiroishi, Yahatanishi-ku, Kitakyushu 806-0004, Japan
Phone +81-93-645-7703 Fax +81-93-645-7802

YASKAWA America Inc. (Motoman Robotics Division)
100 Automation Way, Miamisburg, OH 45342, U.S.A.
Phone +1-937-847-6200 Fax +1-937-847-6277

YASKAWA Europe GmbH (Robotics Division)
Yaskawastrasse 1, 85391 Allershausen, Germany
Phone +49-8166-90-100 Fax +49-8166-90-103

YASKAWA Nordic AB
Verkstadsгатan 2, Box 504, SE-385 25 Torsas, Sweden
Phone +46-480-417-800 Fax +46-486-414-10

YASKAWA Electric (China) Co., Ltd.
22F, One Corporate Avenue, No.222, Hubin Road, Huangpu District, Shanghai 200021, China
Phone +86-21-5385-2200 Fax +86-21-5385-3299

YASKAWA SHOUGANG ROBOT Co. Ltd.
No7 Yongchang North Road, Beijing E&T Development Area, China 100176
Phone +86-10-6788-2858 Fax +86-10-6788-2878

YASKAWA India Private Ltd. (Robotics Division)
#426, Udyog Vihar, Phase- IV, Gurgaon, Haryana, India
Phone +91-124-475-8500 Fax +91-124-475-8542

YASKAWA Electric Korea Corporation
35F, Three IFC, 10 Gukjegeumyung-ro, Yeongdeungpo-gu, Seoul, Korea 07326
Phone +82-2-784-7844 Fax +82-2-784-8495

YASKAWA Electric Taiwan Corporation
12F, No.207, Sec. 3, Beishin Rd., Shindian District, New Taipei City 23143, Taiwan
Phone +886-2-8913-1333 Fax +886-2-8913-1513

YASKAWA Electric (Singapore) PTE Ltd.
151 Lorong Chuan, #04-02A, New Tech Park, Singapore 556741
Phone +65-6282-3003 Fax +65-6289-3003

YASKAWA Electric (Thailand) Co., Ltd.
59, 1st-5th Floor, Flourish Building, Soi Ratchadapisek 18, Ratchadapisek Road,
Huaykwang, Bangkok 10310, THAILAND
Phone +66-2-017-0099 Fax +66-2-017-0199

PT. YASKAWA Electric Indonesia
Secure Building-Gedung B Lantai Dasar & Lantai 1 Jl. Raya Protokol Halim Perdanakusuma,
Jakarta 13610, Indonesia
Phone +62-21-2982-6470 Fax +62-21-2982-6741

©2018 YASKAWA ELECTRIC CORPORATION
Published by YASKAWA

YASKAWA

YASKAWA ELECTRIC CORPORATION

September 2018 18-09

MANUAL NO.
HW1485676

21/21